A CRE Prevention Story

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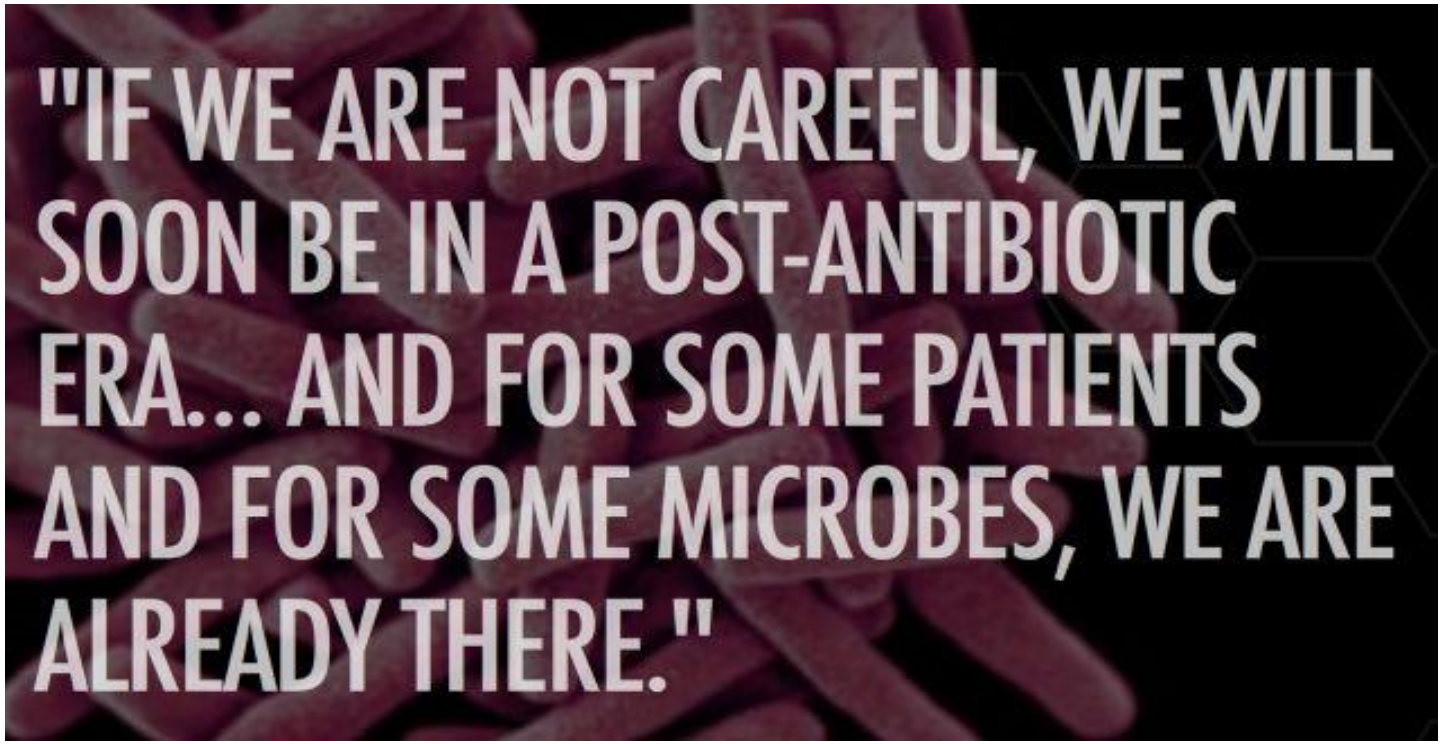
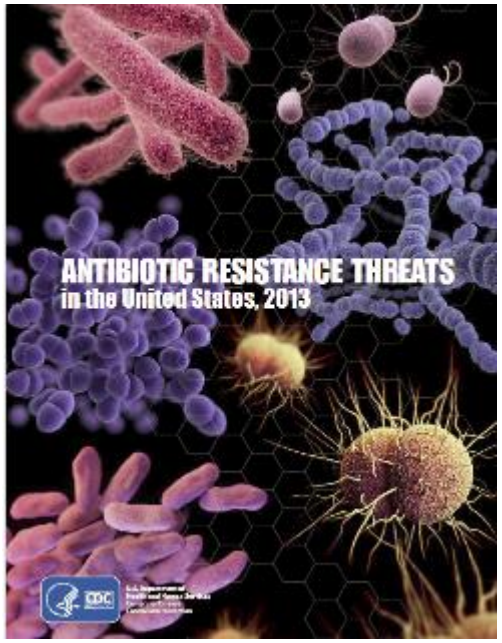
Dr. Frieden, CDC Director, 2013



The Threat is Here!

- CDC's 2013 report sounded the alarm on the silent war
- A global crisis
- CRE (Carbapenem-resistant Enterobacteriaceae) considered an *urgent threat*
- "Nightmare" superbug



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TECH & SCIENCE

THERE'S AN ANTIBIOTIC APOCALYPSE THAT'S GOING TO SEND US BACK TO THE DARK AGES OF MEDICINE

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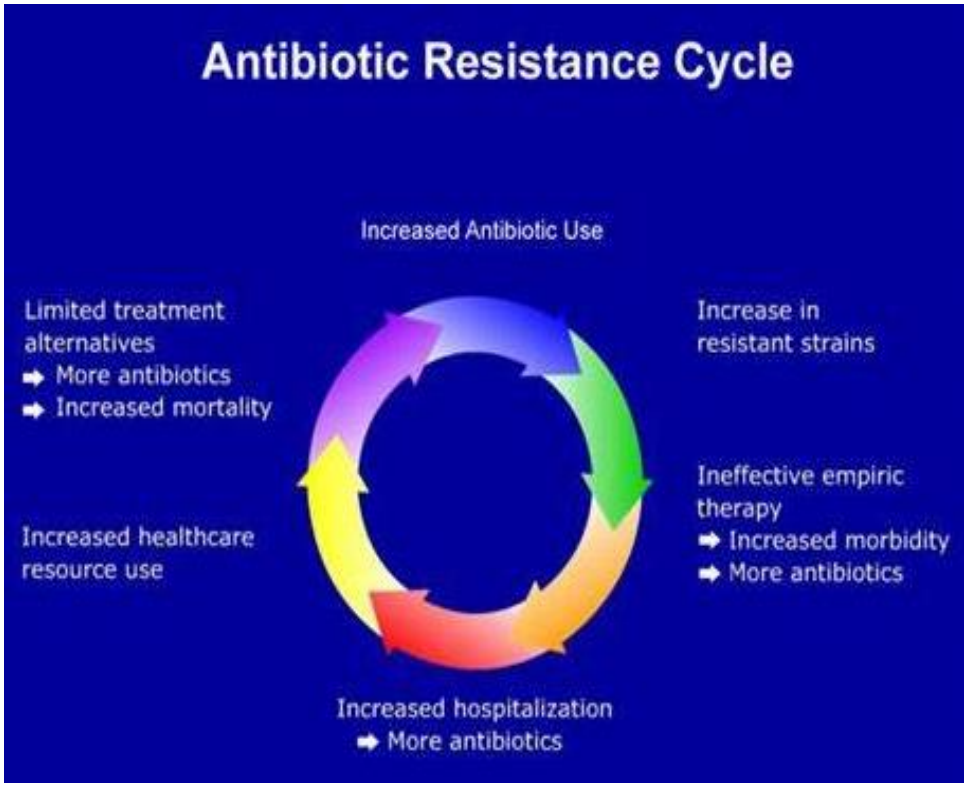
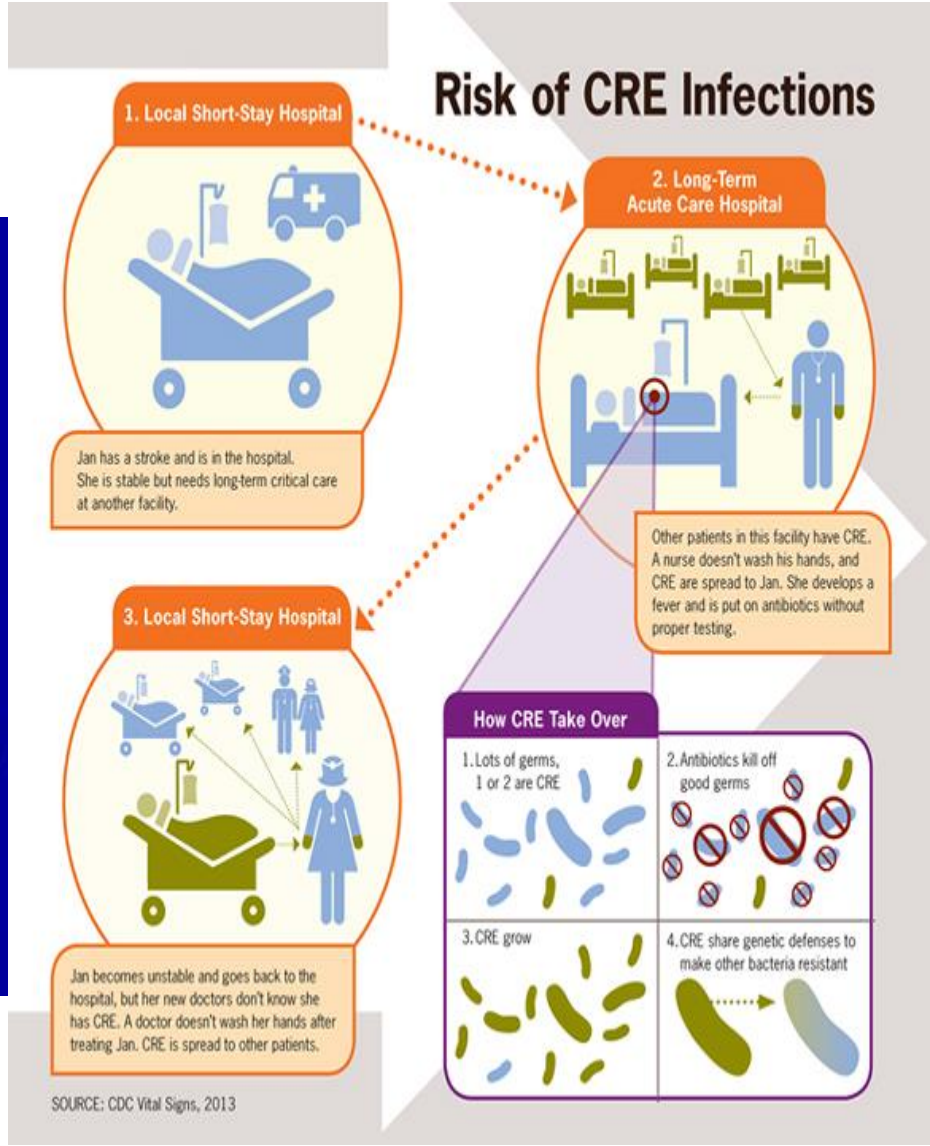
The Cycle…





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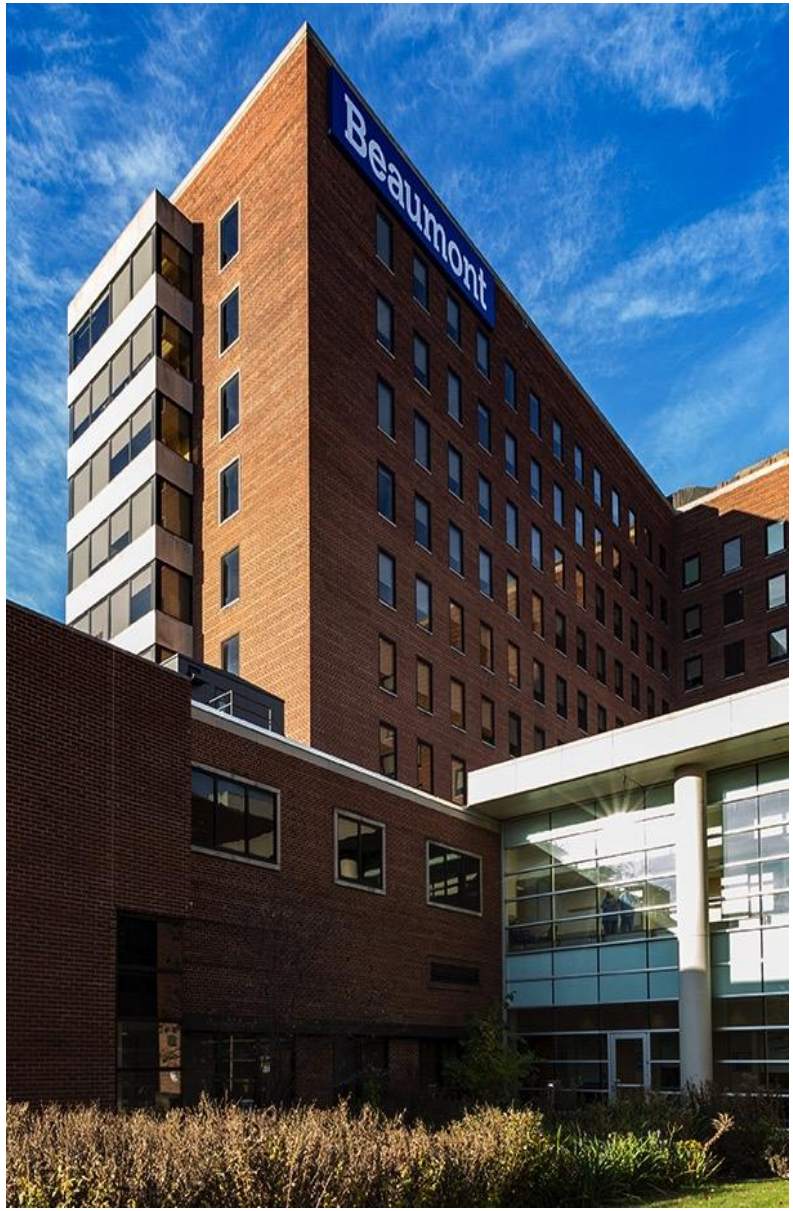
Background Info

- Beaumont Health
  - 8 hospital system
- Located Dearborn, MI
- Acute Care Teaching hospital
  - 632 Licensed beds and 4 ICUs (3 Adult & NICU)
- IP Team: 3 CIPs, Supervisor, NEW Quality RN



Prevention Plan

- The basics!
  - Education campaign (ongoing)
  - Micro lab partnership
  - Prompt identification and isolation
- Antimicrobial Stewardship Awareness
  - The role of providers and frontline nurses
- Targeted LTAC screening
- Daily isolation list process with just-in-time education and patient flagging

2012

- Frontline education on CRE “Superbug”
- Micro validated new carbapenem breakpoints in place of Hodge testing

2013-2014

- Screening and empiric isolation of all patients admitted from LTAC using single peri-rectal culture
- BPA created to remind provider to initiate isolation based on “Point of Origin” for LTAC pts.
- Micro started labeling culture results as MDRO “CRE”

2015-2016

- Aug 2015 New EPIC flagging process for CRE organisms (on patient banner)
- Micro modifies testing protocol for CRE identification

2017-2018

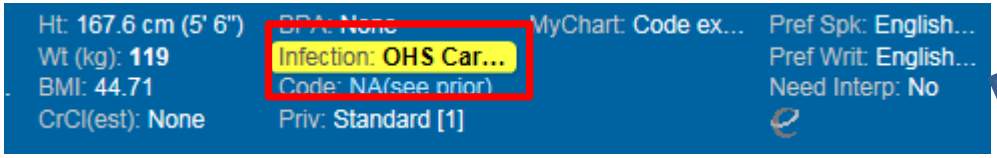
- Began efforts to standardize Beaumont system isolation practices and micro testing via multidisciplinary subgroup; including drafting Interfacility transfer form
- Jan 2018 Micro sends all CRE positive isolates to state BOL for resistance testing
- April 2018 First Novel CRE exposure workup

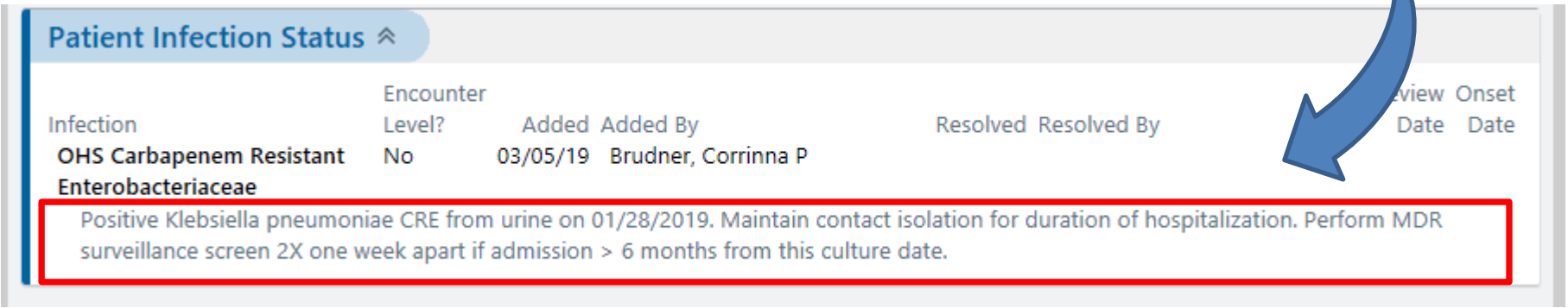
2019 YTD

- Jan 2019 Micro validated Carba-R internal carbapenemase testing; only send novel CREs to the state BOL for confirmation testing
- Micro notifies IP of any novel resistance mechanism and IP investigates
- Implementation of new MDR Screening process
- Update Infection Flags to reflect novel resistance mechanisms

Patient Banner review is Key!

- Infection Prevention will “flag” patient’s who have a history of MDR organisms on the banner
- Standardization of labels and smart phrases





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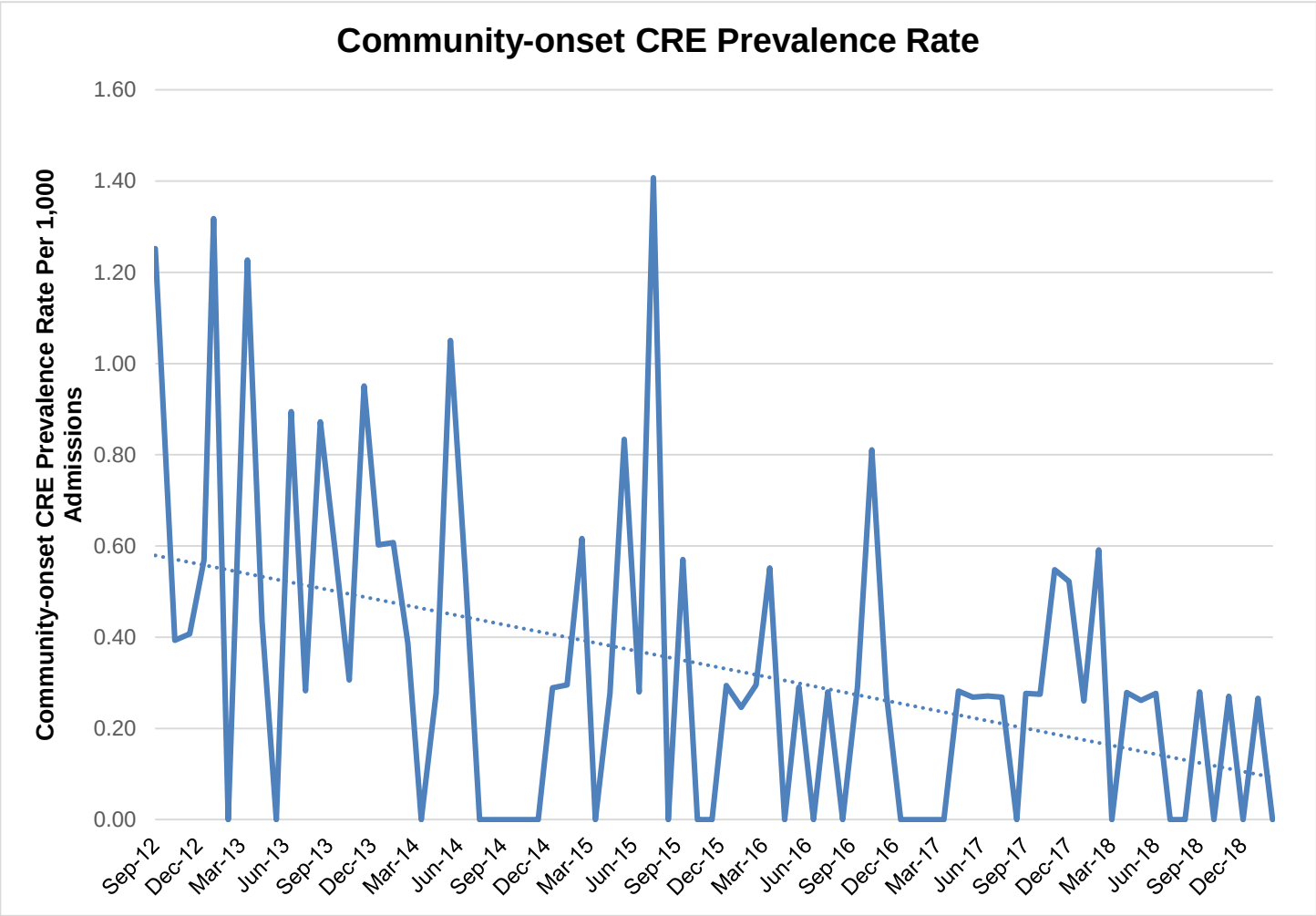
Prevalence: Burden of disease



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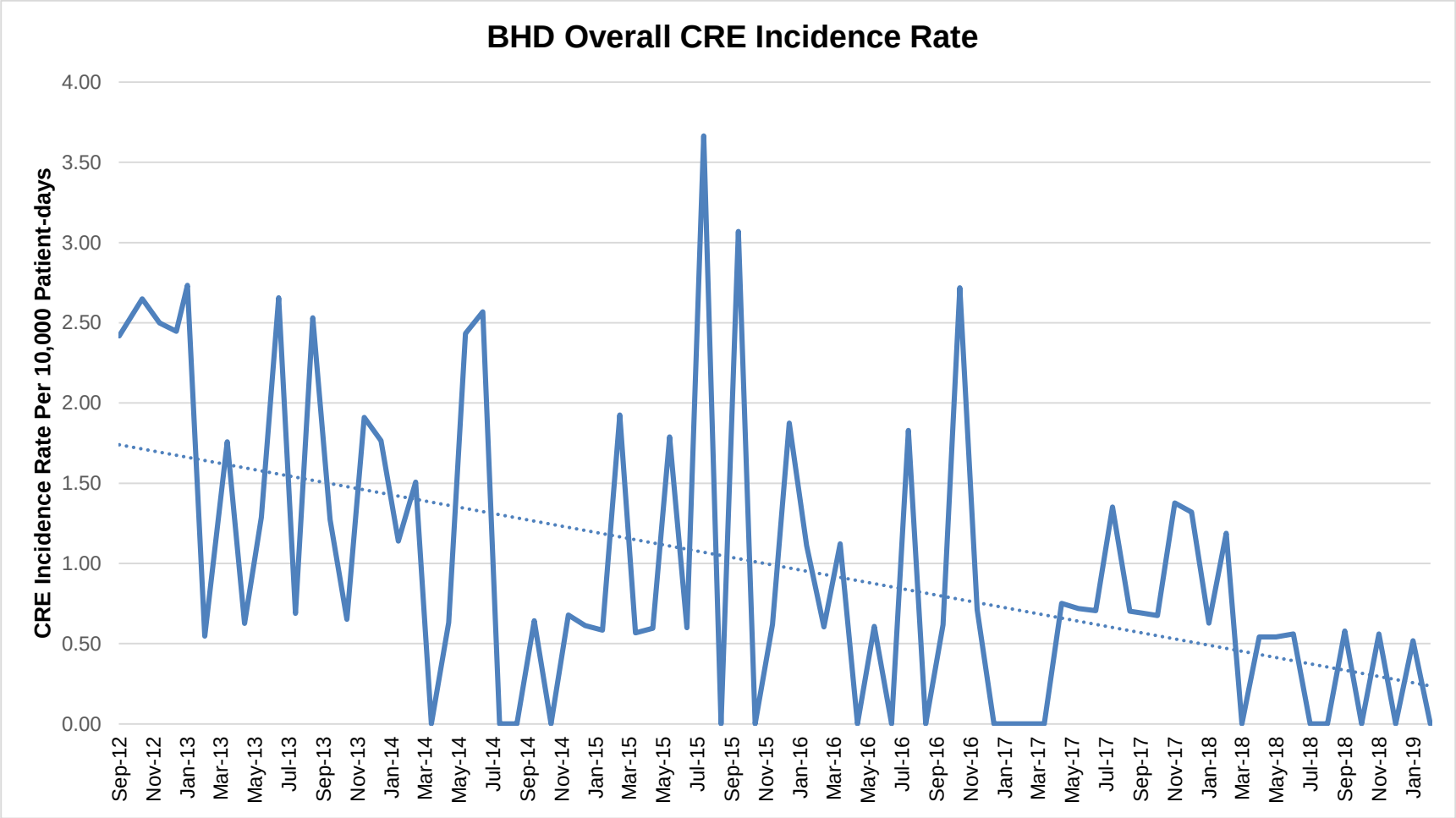
Incidence: Risk of CRE



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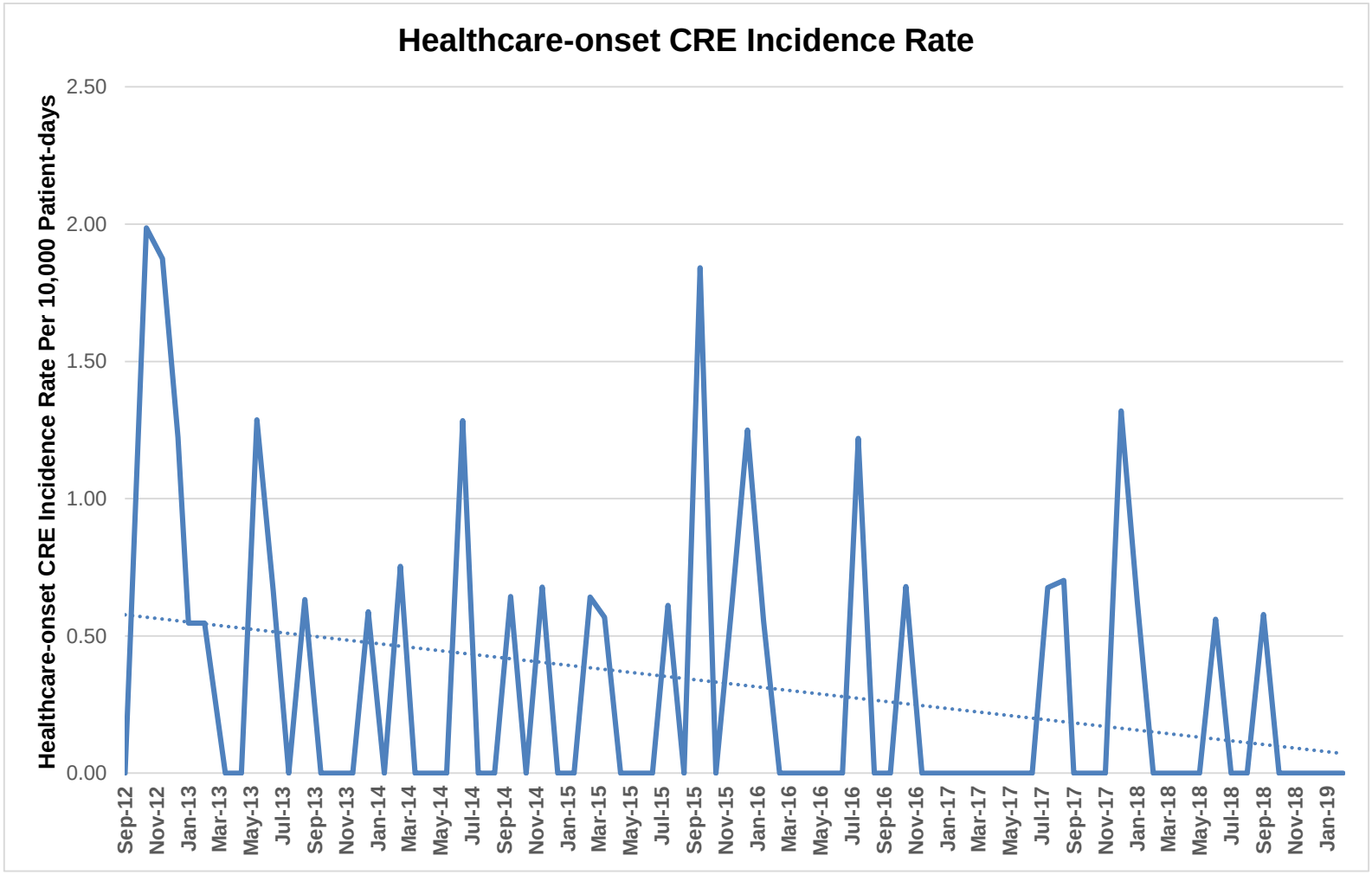
Healthcare-onset CRE Incidence Rate
Healthcare-onset CRE Incidence Rate Per 10,000 Patient-days
2.50
2.00
1.50
1.00
0.50
0.00
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
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May-14
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Nov-18
Jan-19

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Benefits of the CRE Program

- Structured reporting program
  - *prior to MDSS mandatory reporting*
- Kept MDR (multidrug resistant) organism prevention at the forefront of IP program
- Financial support for IP departments
- Strengthened relationships with state HD
- Helpful reports and quarterly calls
- Increased vigilance….

Novel CRE Resistance mechanisms

- Not all CRE are carbapenemase producers
  - *Klebsiella pneumoniae* carbapenemase (KPC)
  - New Delhi metallo-ß-lactamase (NDM)
  - Verona integron encoded metallo-ß-lactamase (VIM)
  - Imipenemase metallo-ß-lactamase (IMP)
  - Oxcillinase-48 (OXA-48)

IP Novel CRE Response

- Mid April 2018 IP was notified by the MDHHS of a inpatient OXA-48 patient (early April admit)
- C-suite and exposed unit(s) were informed
- Outbreak Investigation began
- Exposure window developed and case finding
- Collaboration with CRE Coordinator to develop patient screening plan
- Regular communication (emails/conference calls/face-to-face)

Details of investigation:

- Patient X is a patient with alcoholic liver cirrhosis admitted for encephalopathy
- Previously admitted to another Beaumont facility and treated for possibility of ESBL UTI and sent to SNF
- Patient admitted at Beaumont Dearborn on 4/1 and placed on contact isolation on 4/6 due to positive MDRO in urine culture
- She was in a private room the entire stay
- Brief overlap with roommate
- Education provided to unit staff (current location)and administration notified
- Nursing manger in the floor identified all patients admitted to the floor
- Contact tracing and high risk patient identification

Contact Tracing

- Any patient on the same unit and overlapped 3 days during the time the index patient was not in contact isolation
- Exposure window: 4/1-4/6/2018
- Chart Investigation: 42 patients

BHD April Novel CRE line list of discharged pts with high risk of acquisition:

Patient Name	MRN	Current IP? Y or D/C	LTAC in past 90 days?	Skilled Nursing Facility in past 90 days?	Trach or PEG tube in last 30 days? (indicator for mechanical vent)	Open wounds or decub ulcers? (indicator for chronic illness)	Antibiotic Treatement in past 30 days? (Carbapenems, 3rd/4th gen Cephalosporins, or Fluoroquinolones)	Comments	If patient d/c, current location	Contact #	Address

Screening Process

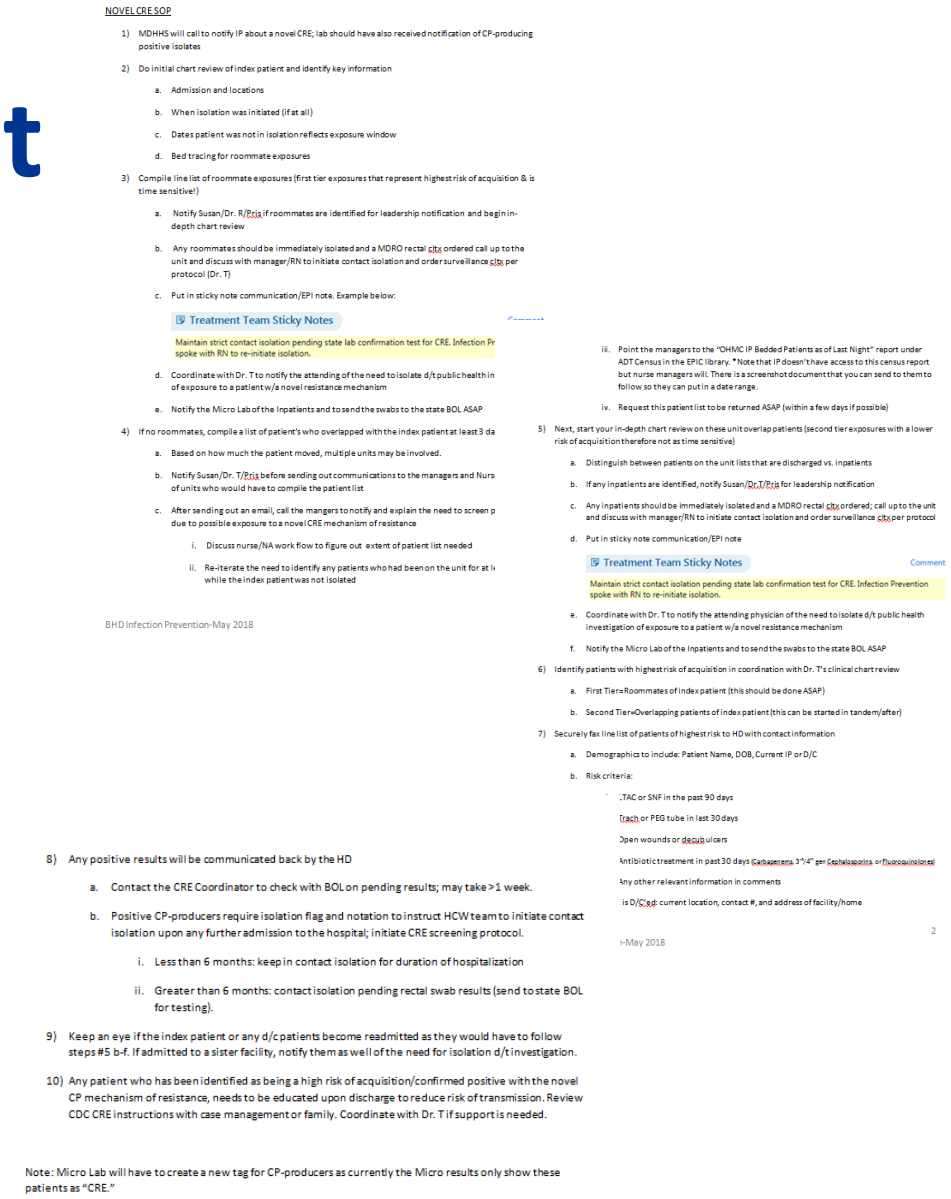
Who to Screen?

- h/o LTAC in the last 90 days
- h/o SNF in the last 90 days
- h/o tracheostomy/feeding tube placement (to indicate patients with possible recent mechanical ventilation)
- Presence of open wounds /pressure ulcers
- Treatment with carbapenems, 3rd or 4th generation cephalosporin and Quinolone use in the last 30 days
- Discharge to home, SNF or LTAC

- 42 patients identified (2 deceased)
- 40 patients total to stratify
  - 2 inpatients in facility when investigation started.
  - 36 patients discharged
  - 4 high risk patients were identified
- Rectal swabs collected and sent to MDHHS and local microbiology lab
- All tested negative
- Investigation closed

SOP development

- Step-by-step playbook
- Various scenarios described
- Criteria for screening
- Example EPIC documentation
- Scripting



NOVEL CRE SOP

1) MDHHS will call to notify IP about a novel CRE; lab should have also received notification of CP-producing positive isolates
2) Do initial chart review of index patient and identify key information
   a. Admission and locations
   b. When isolation was initiated (if at all)
   c. Dates patient was not in isolation reflects exposure window
   d. Bed tracing for roommate exposures
3) Compile line list of roommate exposures (first tier exposures that represent highest risk of acquisition & is time sensitive!)
   a. Notify Susan/Dr. R/Pris if roommates are identified for leadership notification and begin in-depth chart review
   b. Any roommates should be immediately isolated and a MDRO rectal ctx ordered call up to the unit and discuss with manager/RN to initiate contact isolation and order surveillance ctx per protocol (Dr. T)
   c. Put in sticky note communication/EPI note. Example below:

Treatment Team Sticky Notes

Maintain strict contact isolation pending state lab confirmation test for CRE. Infection Pr
spoke with RN to re-initiate isolation.

   d. Coordinate with Dr. T to notify the attending of the need to isolate d/t public health in of exposure to a patient w/a novel resistance mechanism
   e. Notify the Micro Lab of the Inpatients and to send the swabs to the state BOL ASAP
4) If no roommates, compile a list of patient's who overlapped with the index patient at least 3 da
   a. Based on how much the patient moved, multiple units may be involved.
   b. Notify Susan/Dr. T/Pris before sending out communications to the managers and Nurs of units who would have to compile the patient list
   c. After sending out an email, call the mangers to notify and explain the need to screen p due to possible exposure to a novel CRE mechanism of resistance
      i. Discuss nurse/NA work flow to figure out extent of patient list needed
      ii. Re-iterate the need to identify any patients who had been on the unit for at l while the index patient was not isolated

BHD Infection Prevention-May 2018

iii. Point the managers to the "OHMC IP Bedded Patients as of Last Night" report under ADT Census in the EPIC library. *Note that IP doesn't have access to this census report but nurse managers will. There is a screenshot document that you can send to them to follow so they can put in a date range.
iv. Request this patient list to be returned ASAP (within a few days if possible)

5) Next, start your in-depth chart review on these unit overlap patients (second tier exposures with a lower risk of acquisition therefore not as time sensitive)
   a. Distinguish between patients on the unit lists that are discharged vs. inpatients
   b. If any inpatients are identified, notify Susan/Dr.T/Pris for leadership notification
   c. Any inpatients should be immediately isolated and a MDRO rectal ctx ordered; call up to the unit and discuss with manager/RN to initiate contact isolation and order surveillance ctx per protocol
   d. Put in sticky note communication/EPI note

Treatment Team Sticky Notes Comment

Maintain strict contact isolation pending state lab confirmation test for CRE. Infection Prevention spoke with RN to re-initiate isolation.

   e. Coordinate with Dr. T to notify the attending physician of the need to isolate d/t public health investigation of exposure to a patient w/a novel resistance mechanism
   f. Notify the Micro Lab of the Inpatients and to send the swabs to the state BOL ASAP
6) Identify patients with highest risk of acquisition in coordination with Dr. T's clinical chart review
   a. First Tier=Roommates of index patient (this should be done ASAP)
   b. Second Tier=Overlapping patients of index patient (this can be started in tandem/after)
7) Securely fax line list of patients of highest risk to HD with contact information
   a. Demographics to include: Patient Name, DOB, Current IP or D/C
   b. Risk criteria:

.TAC or SNF in the past 90 days
[rach or PEG tube in last 30 days
)pen wounds or decub ulcers
ntibiotic treatment in past 30 days (Carbapenems, 3rd/4th gen Cephalosporins, or Fluoroquinolones)
ny other relevant information in comments
is D/C'ed: current location, contact #, and address of facility/home

-May 2018 2

8) Any positive results will be communicated back by the HD
   a. Contact the CRE Coordinator to check with BOL on pending results; may take >1 week.
   b. Positive CP-producers require isolation flag and notation to instruct HCW team to initiate contact isolation upon any further admission to the hospital; initiate CRE screening protocol.
      i. Less than 6 months: keep in contact isolation for duration of hospitalization
      ii. Greater than 6 months: contact isolation pending rectal swab results (send to state BOL for testing).
9) Keep an eye if the index patient or any d/c patients become readmitted as they would have to follow steps #5 b-f. If admitted to a sister facility, notify them as well of the need for isolation d/t investigation.
10) Any patient who has been identified as being a high risk of acquisition/confirmed positive with the novel CP mechanism of resistance, needs to be educated upon discharge to reduce risk of transmission. Review CDC CRE instructions with case management or family. Coordinate with Dr. T if support is needed.

Note: Micro Lab will have to create a new tag for CP-producers as currently the Micro results only show these patients as "CRE."

SOP development

1) Notification and coordination with the HD
2) Details to look for when doing chart review
3) Exposure investigation
   - Initial review of index patient
   - First tier exposures= roommates
   - Second tier exposures=patients that overlapped
4) Details of how to manage exposed patients and screening protocol
5) Communication timeline for leadership & frontline (nursing/providers)
6) Instructions on when and what to fax to the HD
7) Management and follow-up flagging of any positive result
8) Tips on education of patients upon discharge with novel CRE

Learnings:

- Ongoing education (frontline providers, staff, patients and visitors)
- Opportunities for CP- CRE testing to quickly identify patients
- Contact investigation of novel mechanisms is time consuming but necessary
  - KPC is endemic in SE Michigan and BHD
  - Identifying high risk contacts
- Rectal swab sent to MDHHS and to Dearborn lab concurrently
- If local testing negative possibly removing isolation
- CRE flagging for any patient's with novel resistant mechanism; initiate isolation and screen accordingly on readmission(s)
- SOP development is always a good idea!

Questions?